Innovation as core business of modern armed forces

....the best partner to improve your time critical operations....

Washington, 6 August 2003

Lex Bubbers
LTC (ret) RNLA
lex@reinforce.nl

Contents

- Background
- The operational challenge
- ??
- A possible approach

Background Reinforce

1992

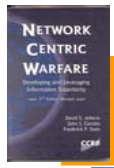
C2 Philosophy

1995

PB-ATCCIS

ISIS / BMS

2001



NCW

AMFL

1 DIV

C2 Support Centre

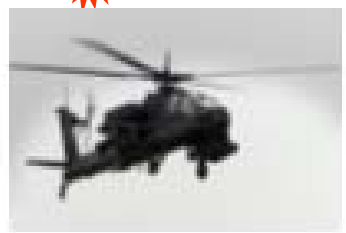
C3-Architecture

TITAAN / C2WS

Hit and run terror

Counterattack

Refugees



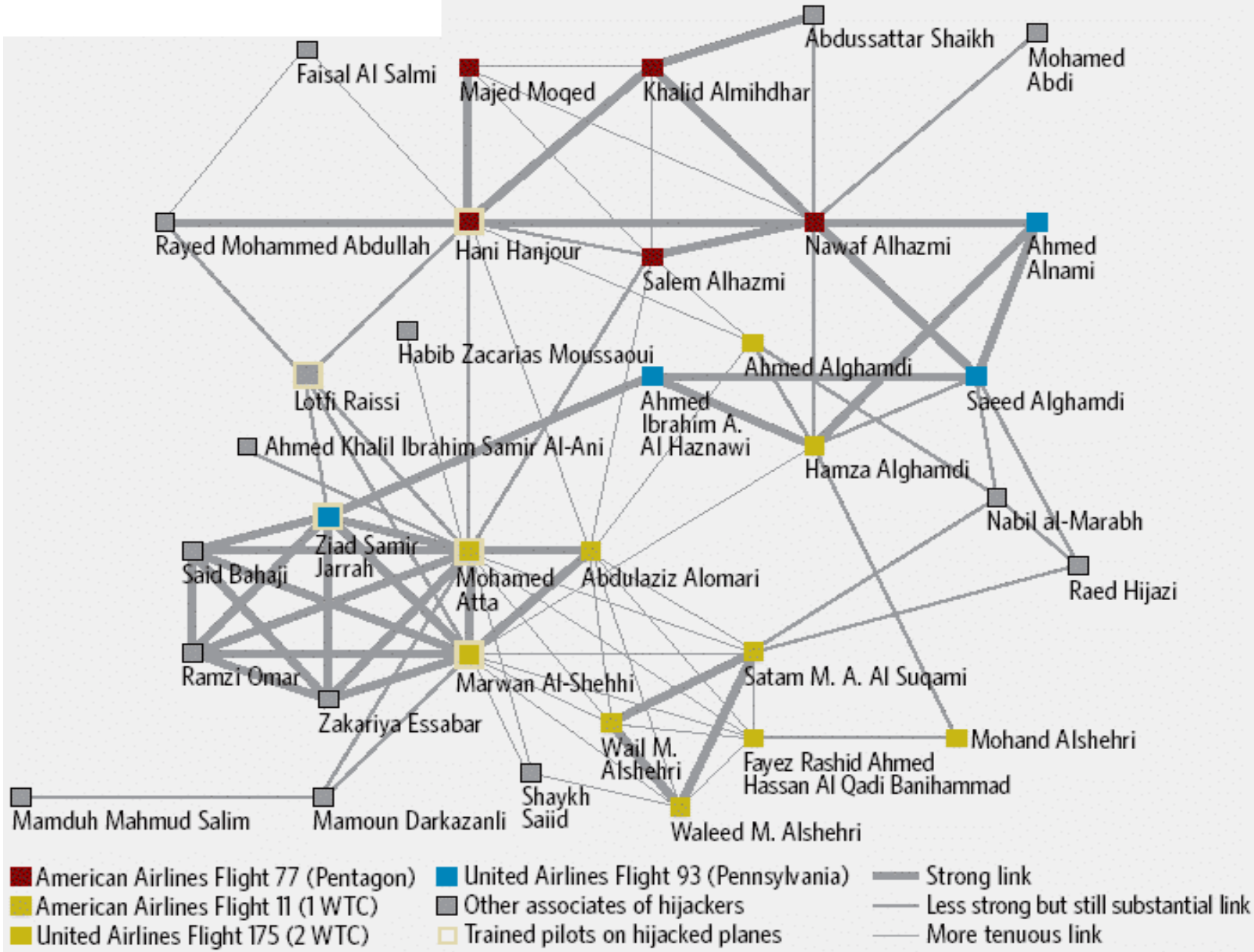
Ambush

Internet

CNN

Roadblock incident

Anthrax


Abdussattar Shaikh
Mohamed Abdi
Faisal Al Salmi
Majed Moqed
Khalid Almihdhar
Rayed Mohammed Abdullah
Hani Hanjour
Nawaf Alhazmi
Ahmed Alnami
Salem Alhazmi
Habib Zacarias Moussaoui
Ahmed Alghamdi
Lotfi Raissi
Ahmed Ibrahim A. Al Haznawi
Saeed Alghamdi
Ahmed Khalil Ibrahim Samir Al-Ani
Hamza Alghamdi
Nabil al-Marabh
Ziad Samir Jarrah
Said Bahaji
Mohamed Atta
Abdulaziz Alomari
Raed Hijazi
Ramzi Omar
Marwan Al-Shehhi
Satam M. A. Al Suqami
Zakariya Essabar
Wail M. Alshehri
Mohand Alshehri
Fayez Rashid Ahmed Hassan Al Qadi Banihammad
Shaykh Saiid
Mamduh Mahmud Salim
Mamoun Darkazanli
Waleed M. Alshehri
American Airlines Flight 77 (Pentagon)
American Airlines Flight 11 (1 WTC)
United Airlines Flight 175 (2 WTC)
United Airlines Flight 93 (Pennsylvania)
Other associates of hijackers
Trained pilots on hijacked planes
Strong link
Less strong but still substantial link
More tenuous link

Operational needs

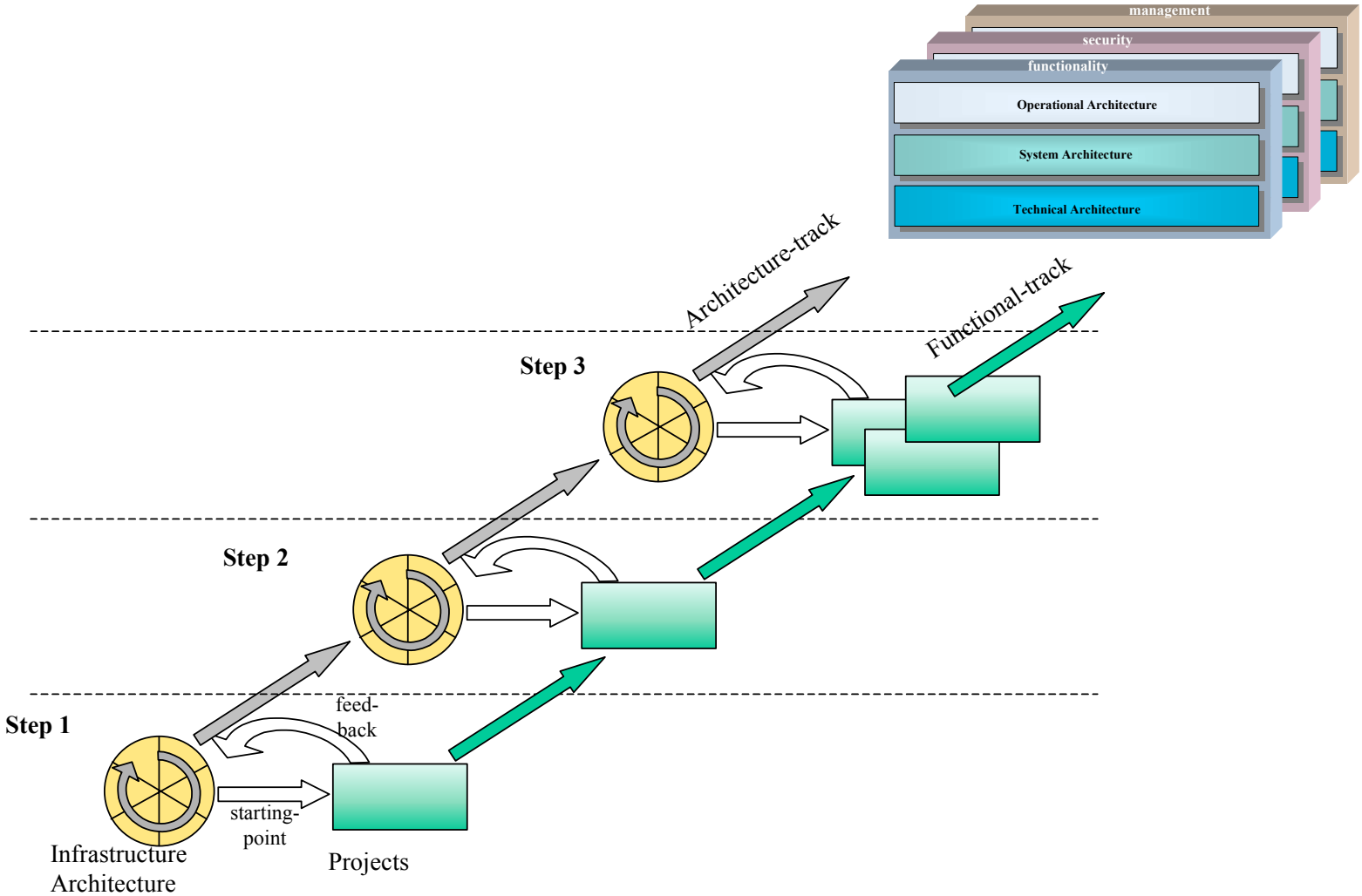
- Supports all kinds of operations
  - The foreseen and the unforeseen
- Real time information supply
- Situational awareness
- Integration of information
- Open and interoperable (incl. civil systems)
  - NGO's, Allies etc
- Easy to use and to manage
- State of the art technology
- Remote and local systems management

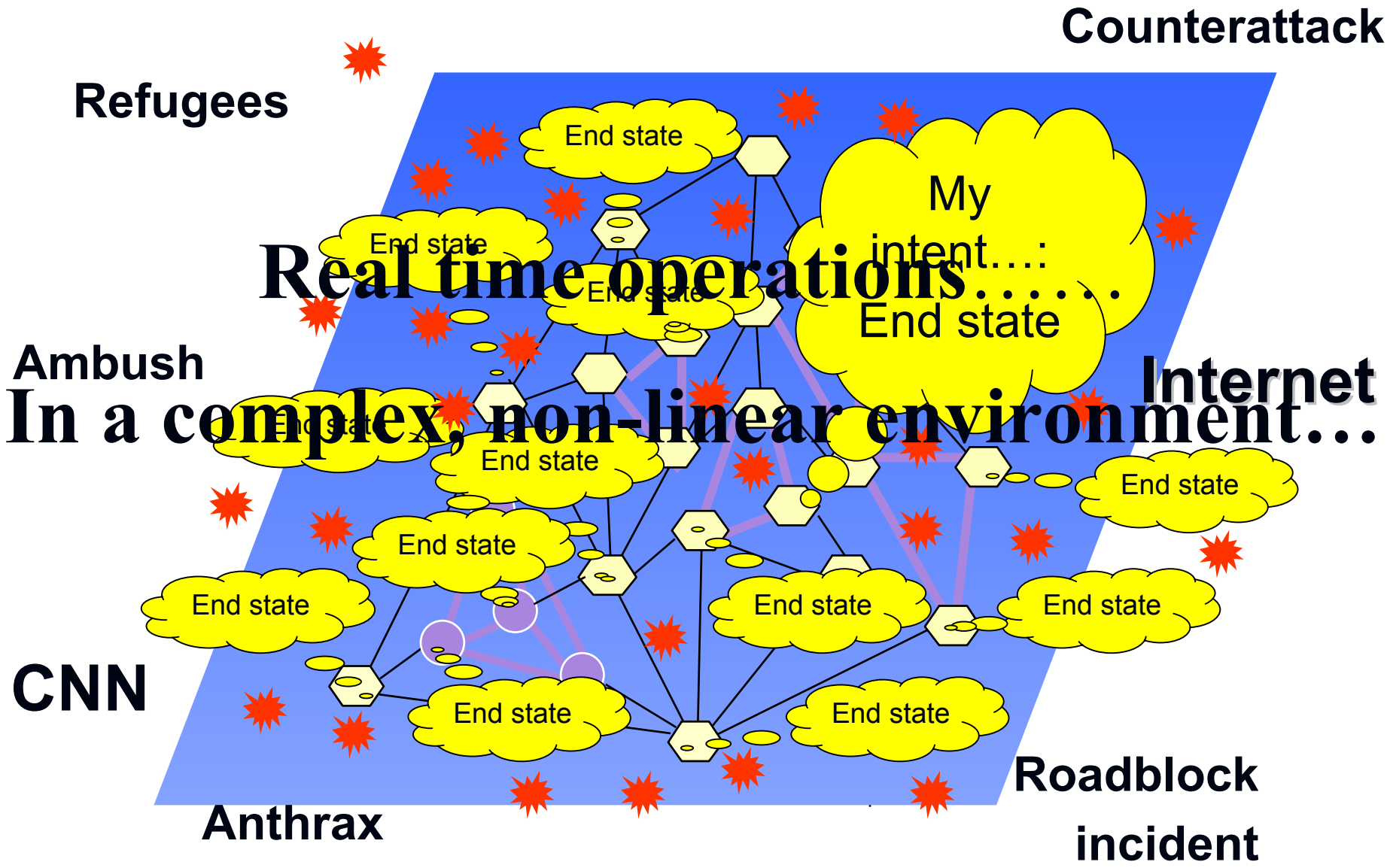

?
How do we get there
?
Lack of vision
Acquisition rules
No money
The leaders don't understand
What is our mission?
It takes too long
ROI?
Our culture is anti-innovation
Industrie does not understand

Architectural approach

	Conceptual What	Logical How	Physical Implementation
Operational Architecture	Operational mission - *Strategy* - *Requirements* *Operations*	Information Service - *Operational service* - *Information groups* - *Usage service*	Organization Administrative organization Training, support
System Architecture	Application Services - GIS / COP - Information exchange - *Decision support* - *workflow* - *transaction* - *data services* - *access control* -...	App. portfolio arch Logical data arch	Physical app. Portfolio arch
Technical Architecture	Technical Services - *Transactional* - *Directory* - *Communication* - *DBMS* - *Replication* - ...	Logical technical framework	

Evolutionary approach




Counterattack
Refugees
End state
End state
End state
My intent….:
End state
Real time operations……
Ambush
Internet
In a complex, non-linear environment…
End state
End state
End state
End state
End state
End state
End state
End state
CNN
End state
End state
Roadblock
Anthrax
incident

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- Integrated Staff Information System
- Theater Independent Tactical Army and Airforce Network

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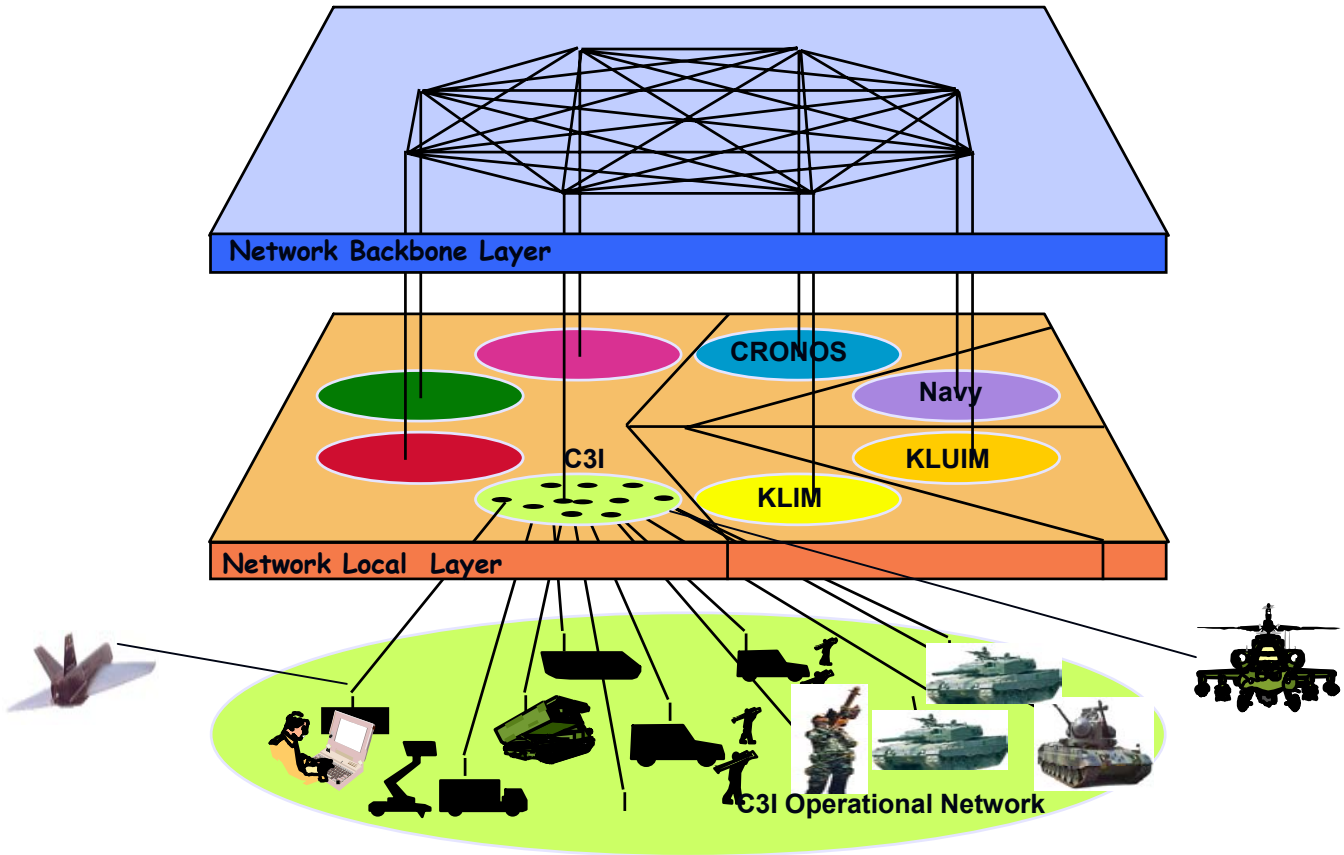
Network Centric Operations



Critical Succes Factors

Information management

Leadership

Technology

Operational concept

Training

Organization

Culture

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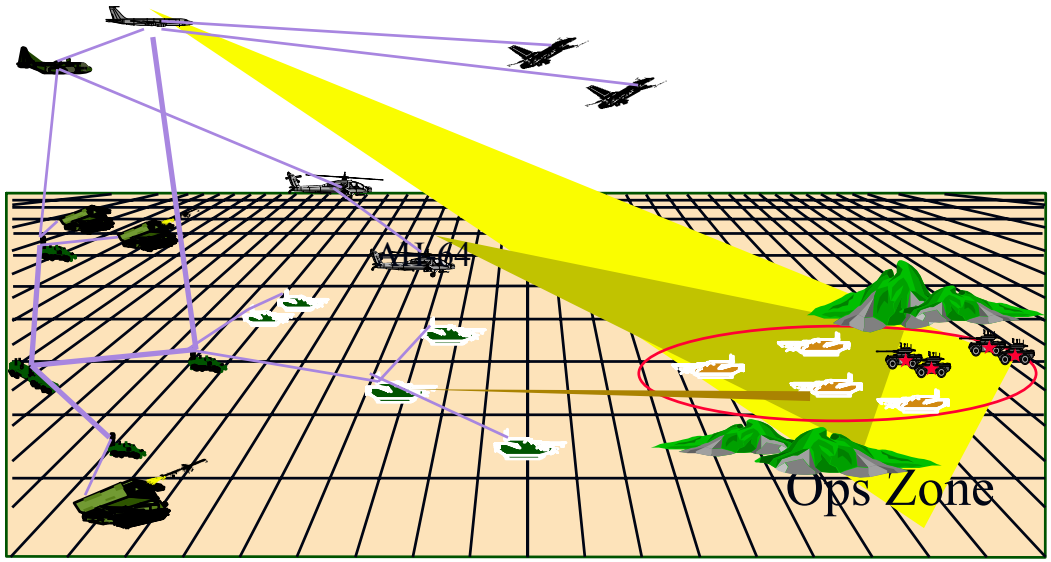
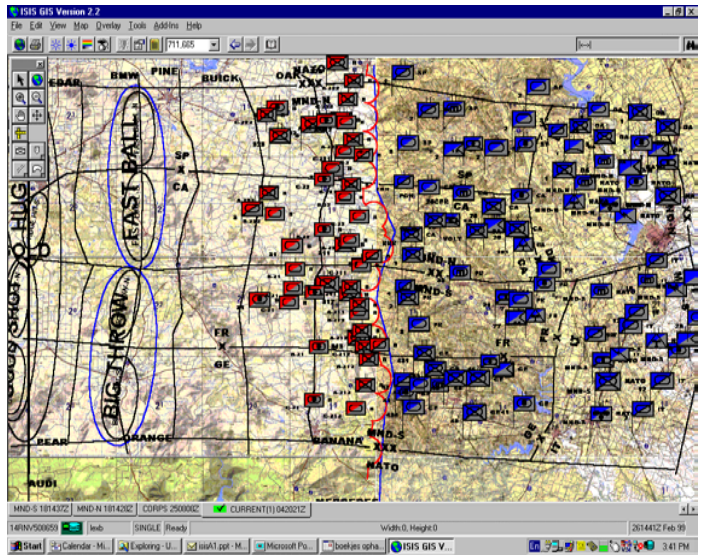
The starting point in 1995

Battlespace Awareness





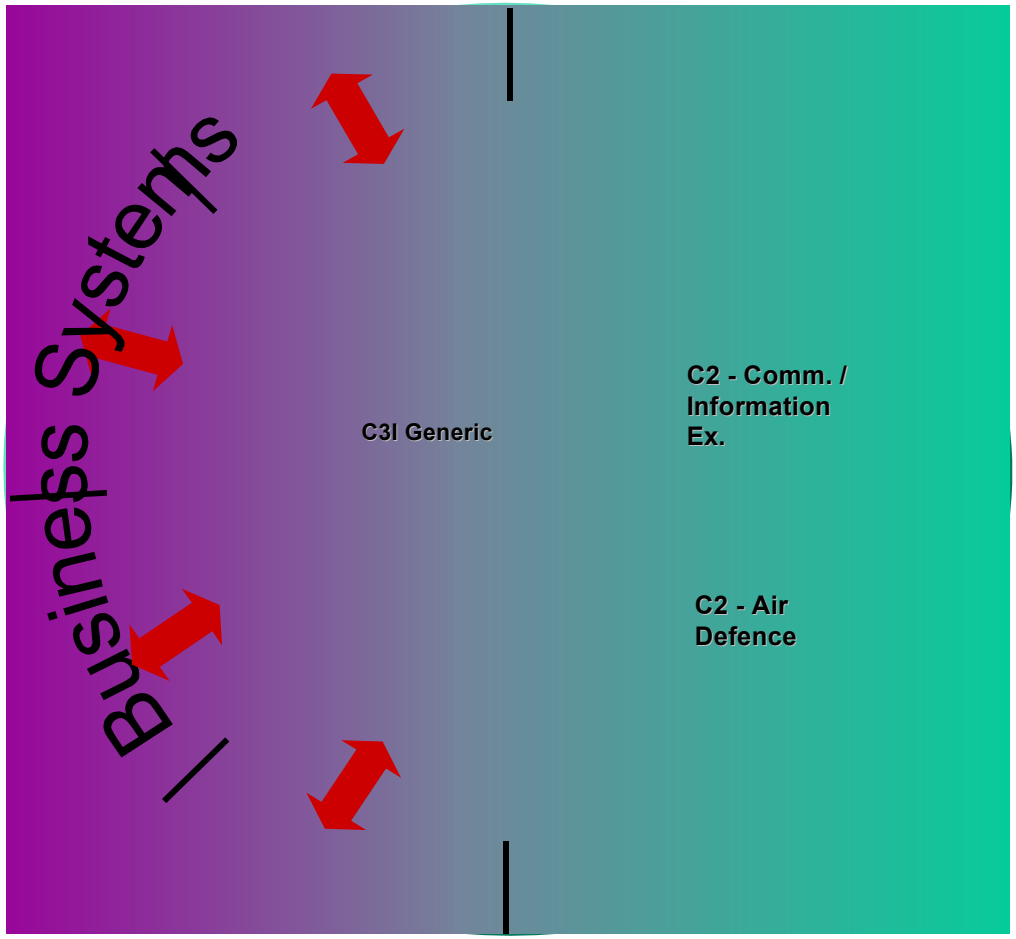
Increased Battlespace Awareness

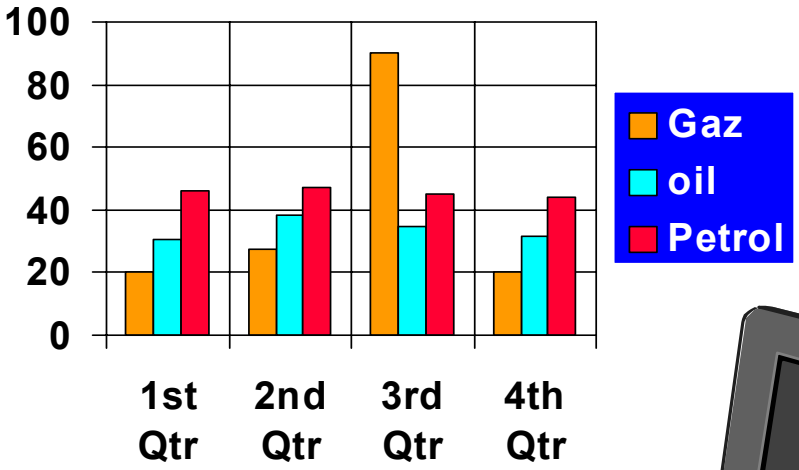
- **Where Am I?**
- **Where Are My Buddies?**
- **Where Is the Enemy?**

The Integrated Staff Information System

ISIS

- One Integrated System





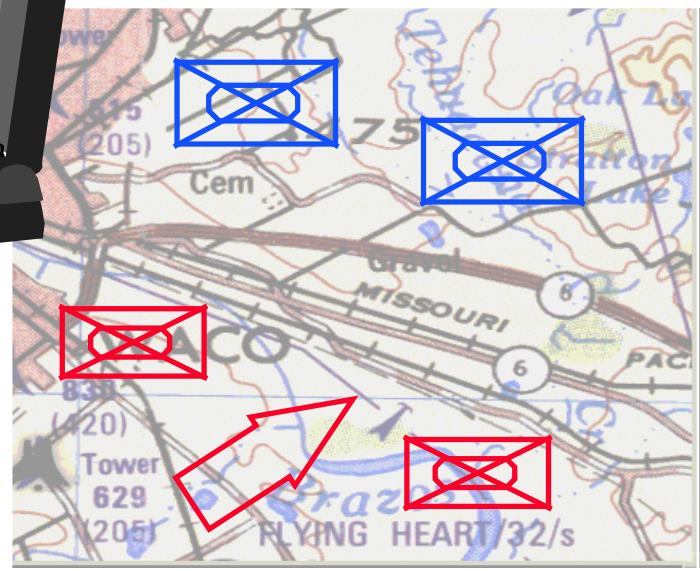
1 Div

Koninklijke Landmacht Intern Memorandum

Aan

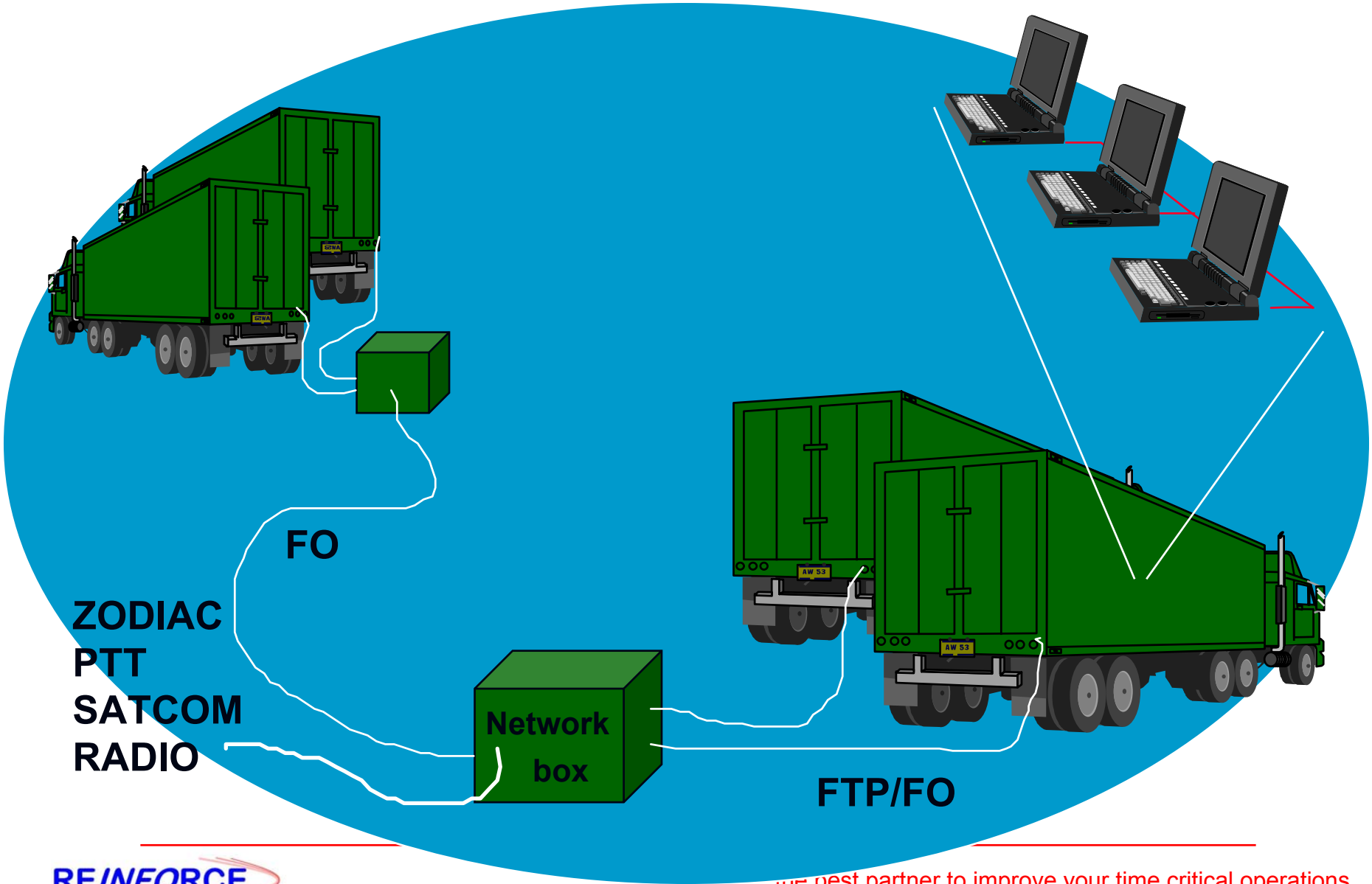
Van

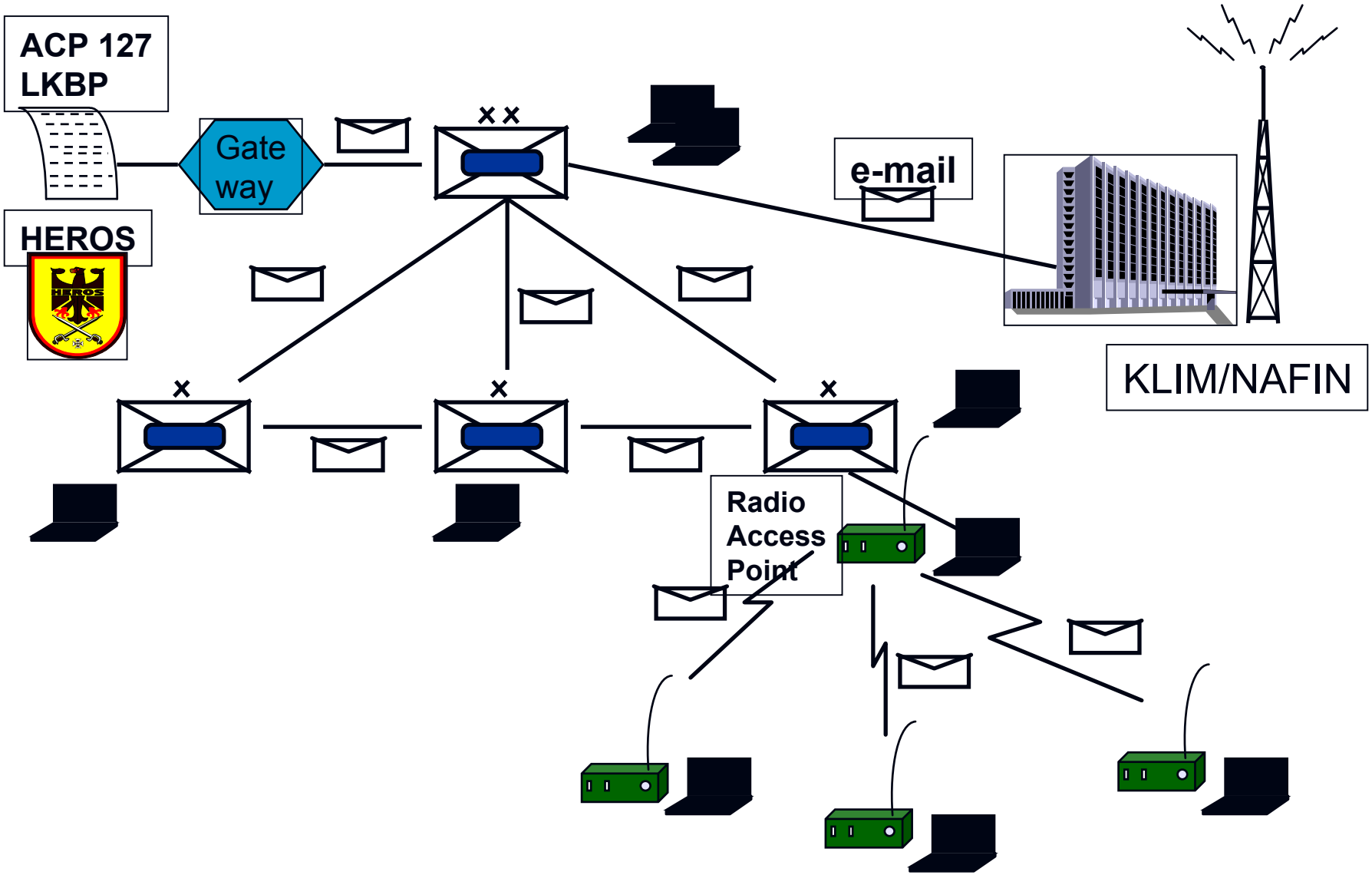
Datum



Common applications:
-Command and Control
-Administrative
-Office

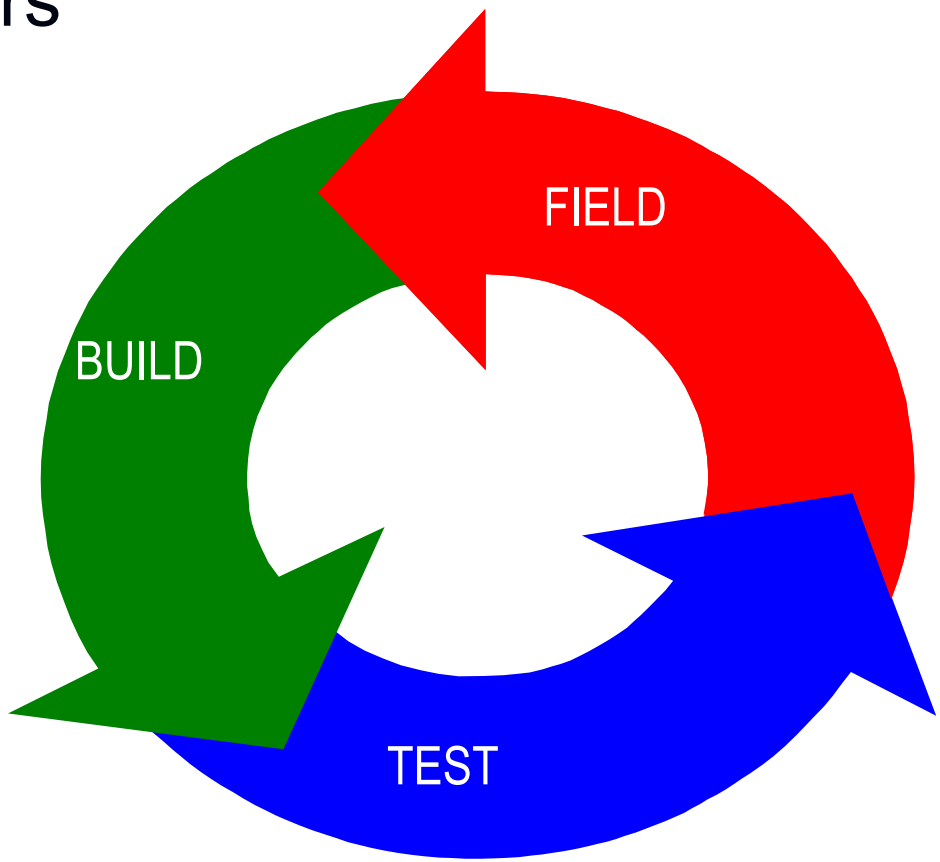
Tactical Lan Facilities



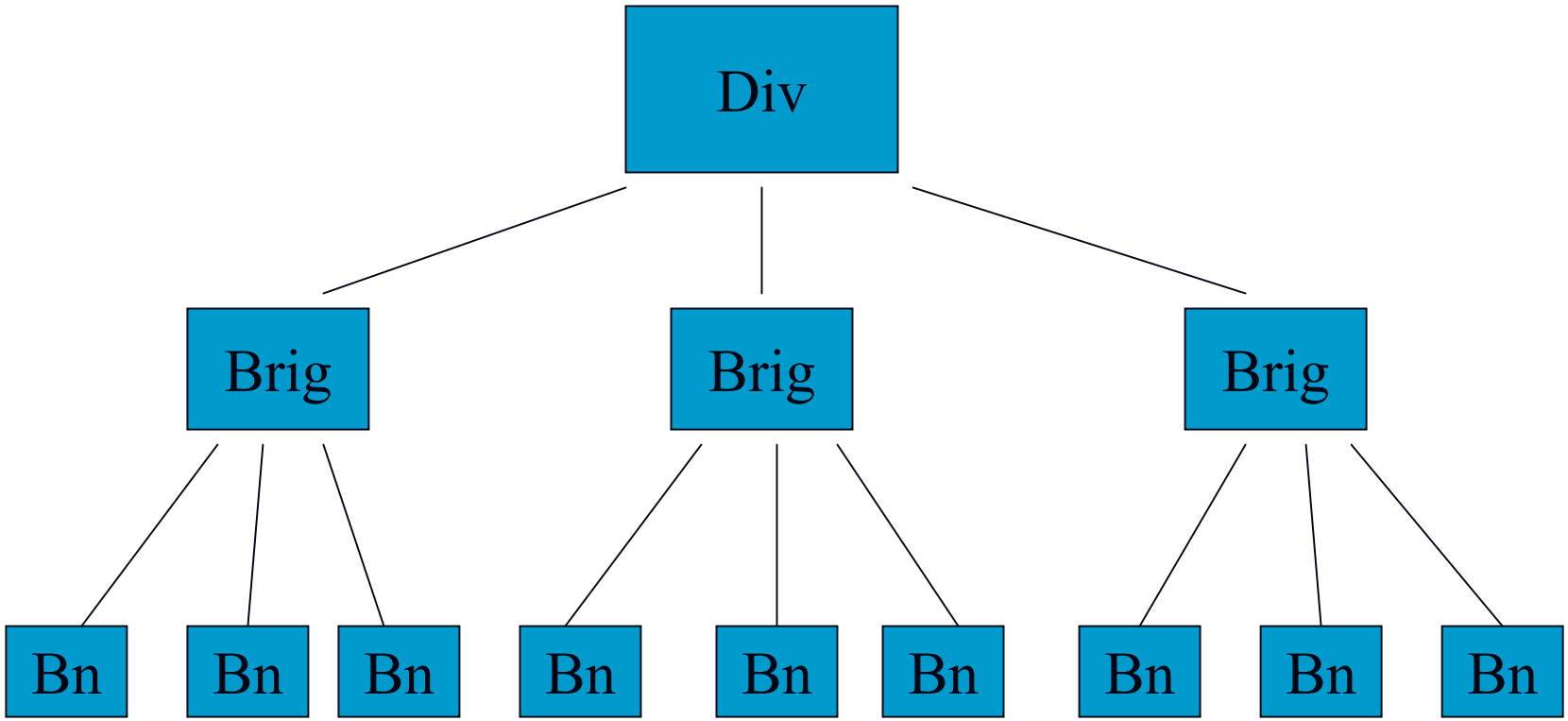

ACP 127
LKBP
Gate
way
HEROS
e-mail
KLIM/NAFIN
Radio
Access
Point

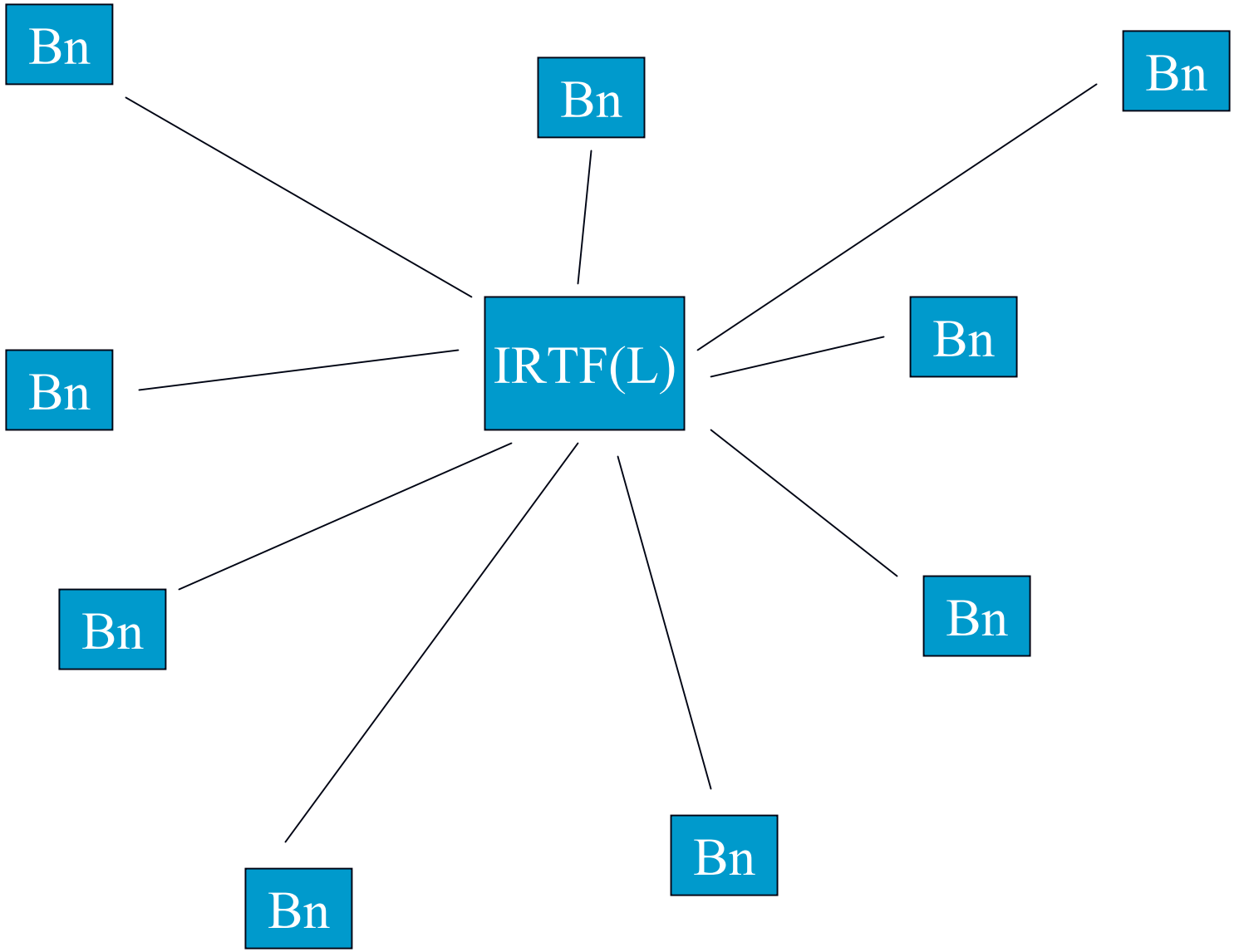
Evolutionary approach

- Learning by doing
- 10 cycles in three years
  - Technology
  - Leadership
  - Culture
  - Organization
  - etc



Some results: change of organization

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IRTF(L)
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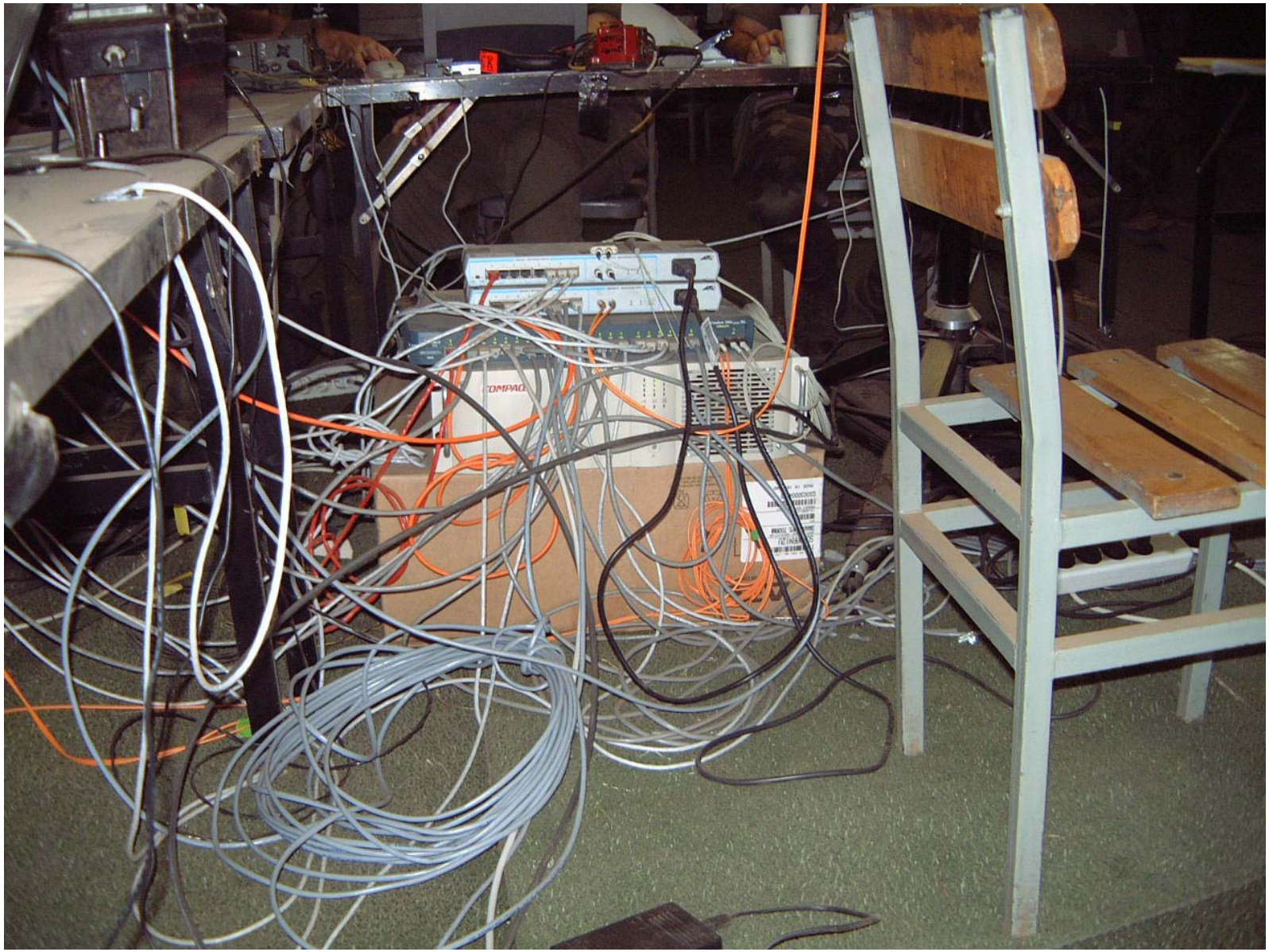
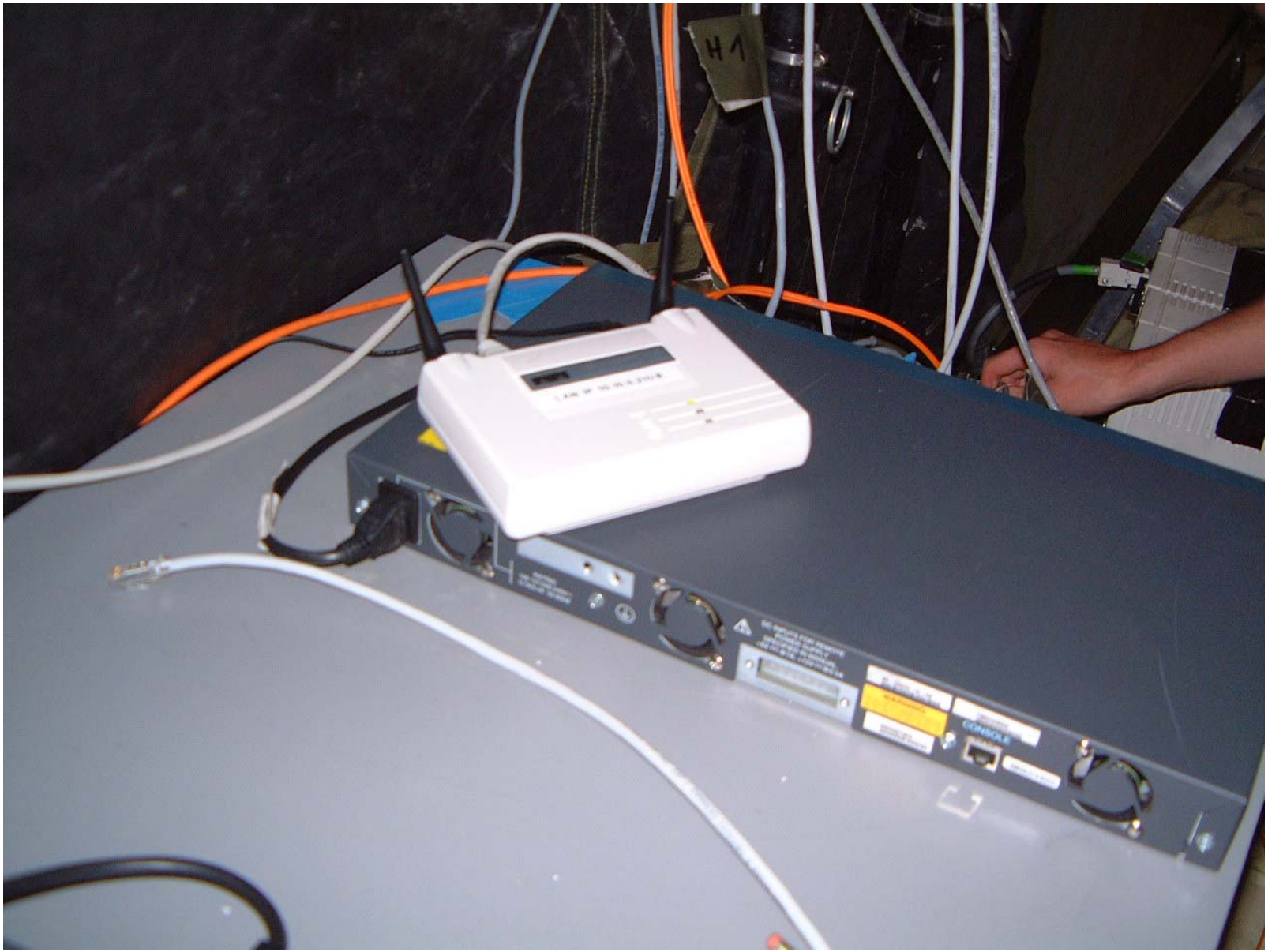
Bn


COMPAQ


H1

Metrics

- ISIS development
  - 3 years
  - 20 pilots/fieldings
  - 10 Million USD
- ISIS operational gain
  - Situational awareness
  - Speed of command
    - 8 hours for C (UK) Recce Bn
    - 12 hours for G3 1(NL) Div

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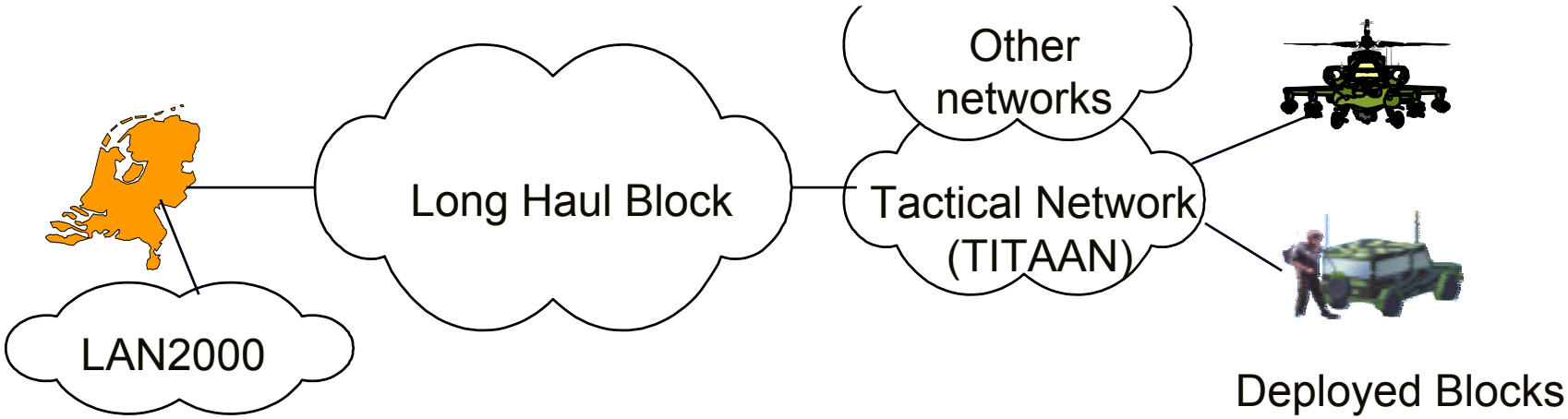
TITAAN

- Theater Independent Tactical Army and Airforce Network



  - End-to-end information transfer network that supports army operations:
    - The consumers of the infrastructure are soldiers
    - Seamless and interoperable networking
    - Network must support many services (voice, data, images)

TITAAN

- Operational requirements
  - Enable shared battle space awareness
  - Supports all deployment scenario's
  - Supports all kinds of services (e.g. voice, data, video)
  - Supports all kinds of (converged) applications
  - Integrates sensor, vehicle, and HQ systems
  - Adaptable (operational and technical) and configurable
  - Reliable and secure
  - Open and interoperable (incl. public systems)
  - Remote and local management
  - Easy to use and to manage

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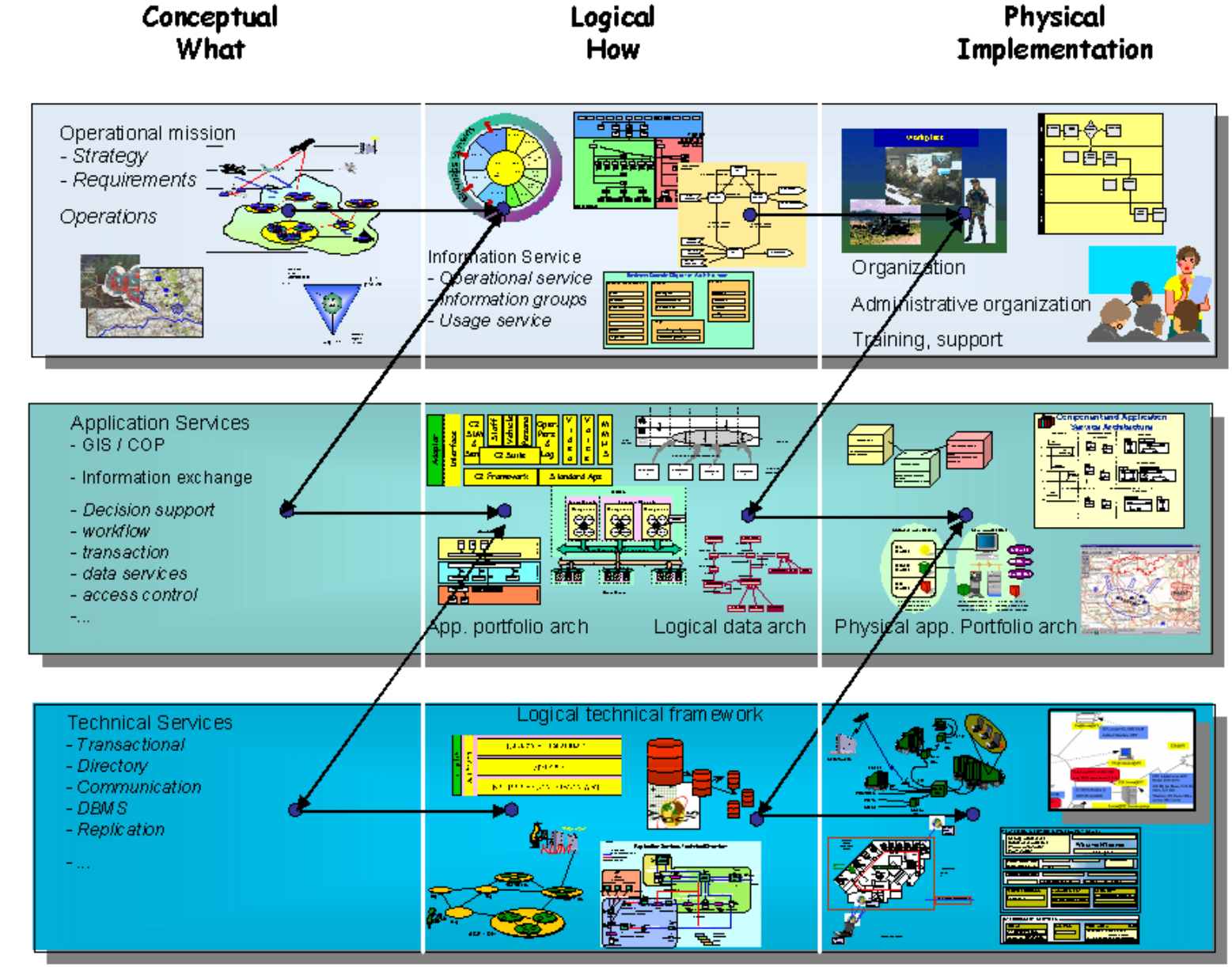
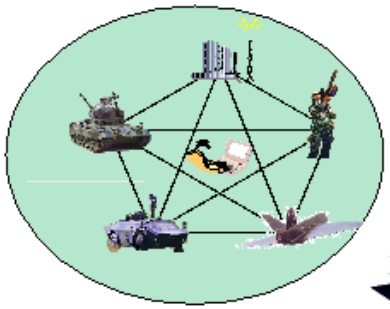
C3I Architecture



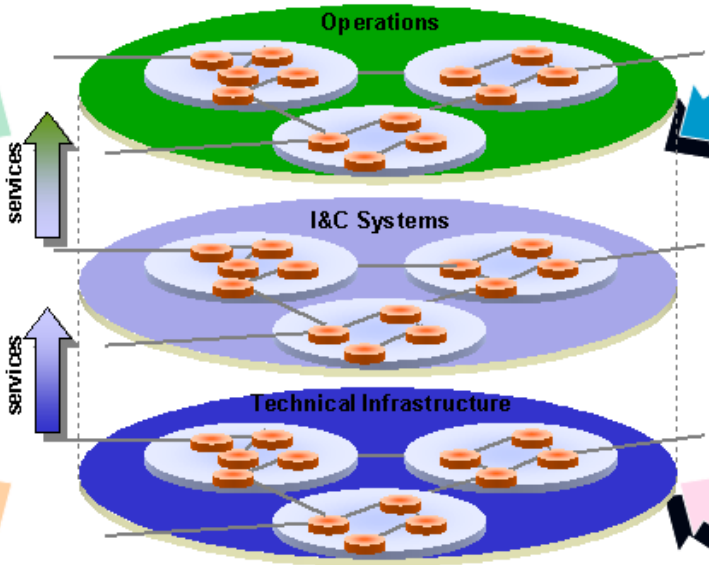
C3I architecture basic principles



Zero-Latency

Zero-Dependency

Zero-Maintenance



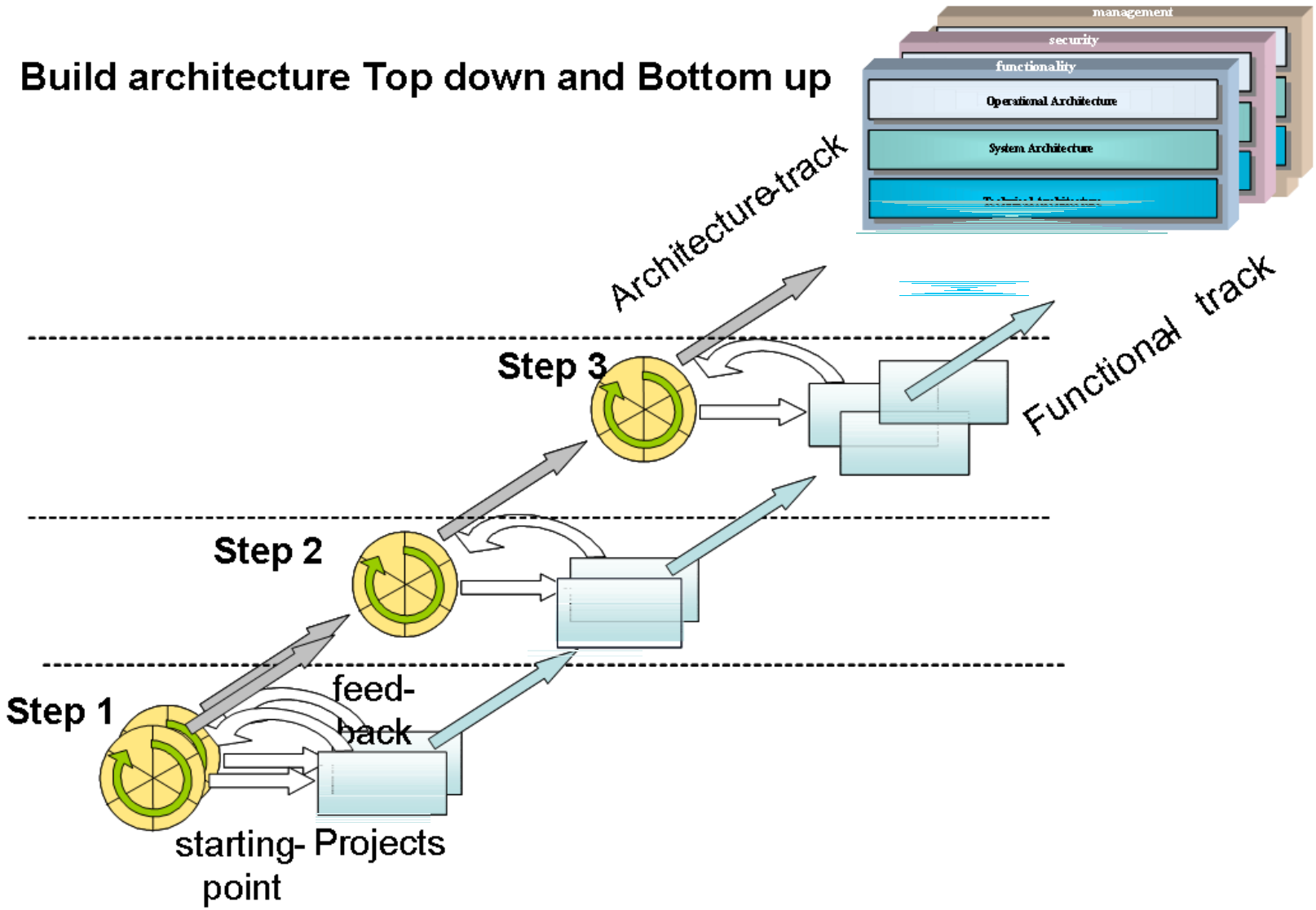
Layered
Service Oriented
Component Based

Actor Based Security

C3I architecture

- Basic ICT standards
  - Microsoft architecture
    - Windows 2000
    - MS Office
    - MS Back office
    - Active directory
  - TCP/IP routing
    - Internet protocols
  - CISCO network components
  - Intel platform
    - Toshiba portables
    - IBM desk tops
    - Compaq servers

Development Strategy



TITAAN development phases

- Phase 1: HRFHQ, basis network
- Phase 2: 11 AMB + Airforce (incl cellular radio)
- Phase 3: Radio systems and replacement radio relay

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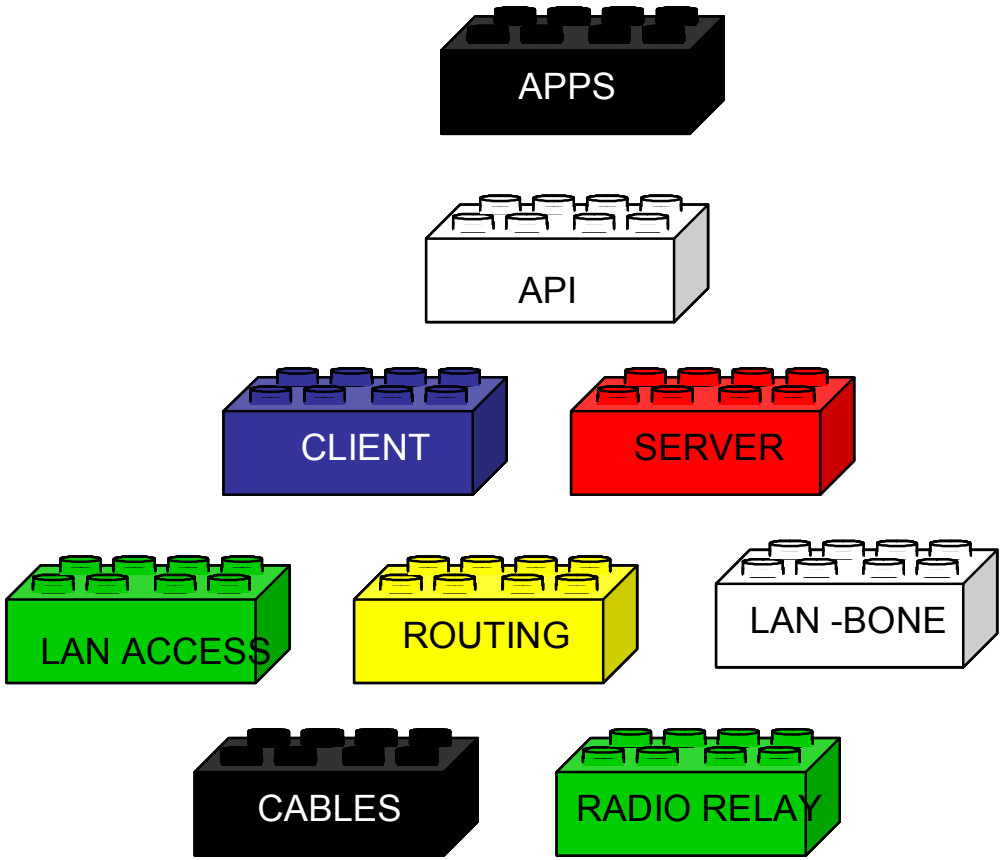
TITAAN design

- Design guidelines
  - Commercial and Military off the shelf (COTS/MOTS)
  - Adoption of civil (Internet) standards
  - WINTEL platform
  - All services running on IP => glue at network layer
  - Classification up to confidential (NATO, UN, WEU, National)
  - Interoperability (national, NATO, public etc)
  - Based on C3I architecture
  - Evolutionary approach

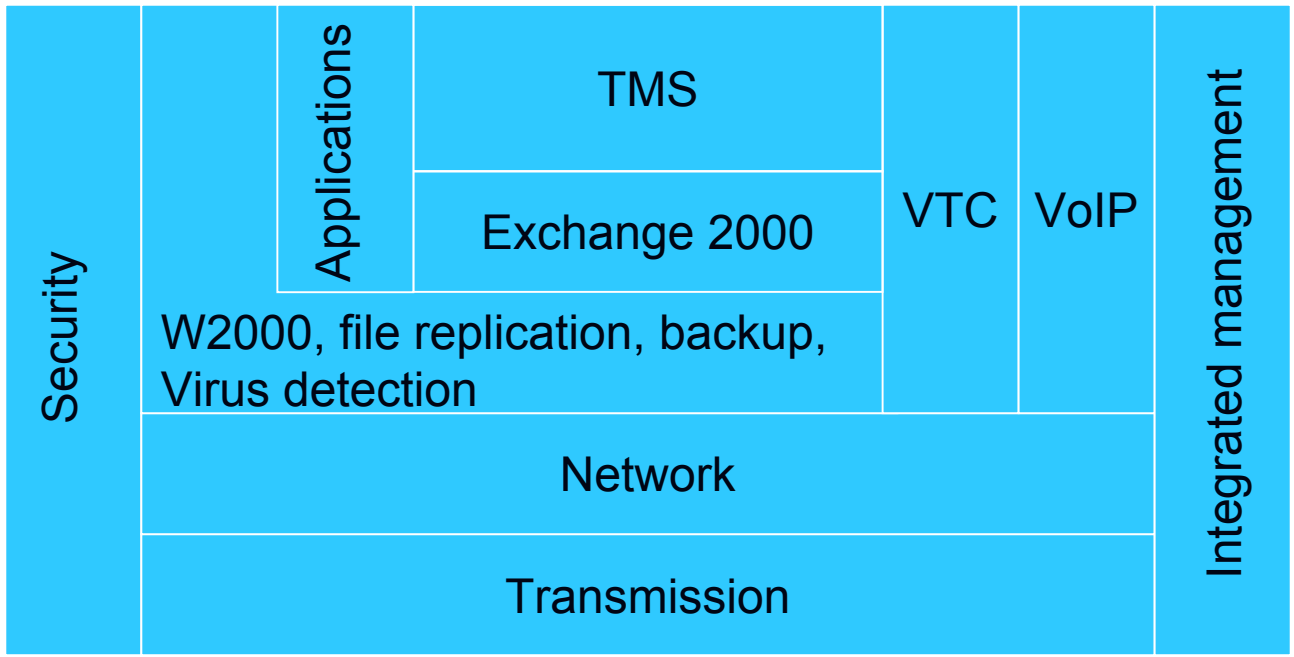
TITAAN design

- Modular approach with building blocks



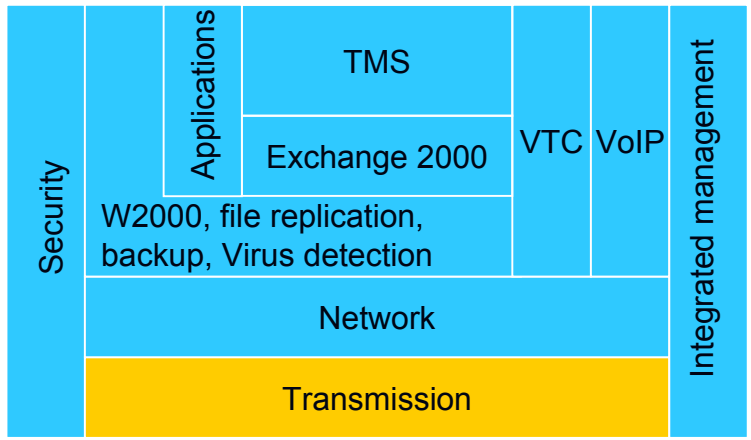
TITAAN Design

- Components



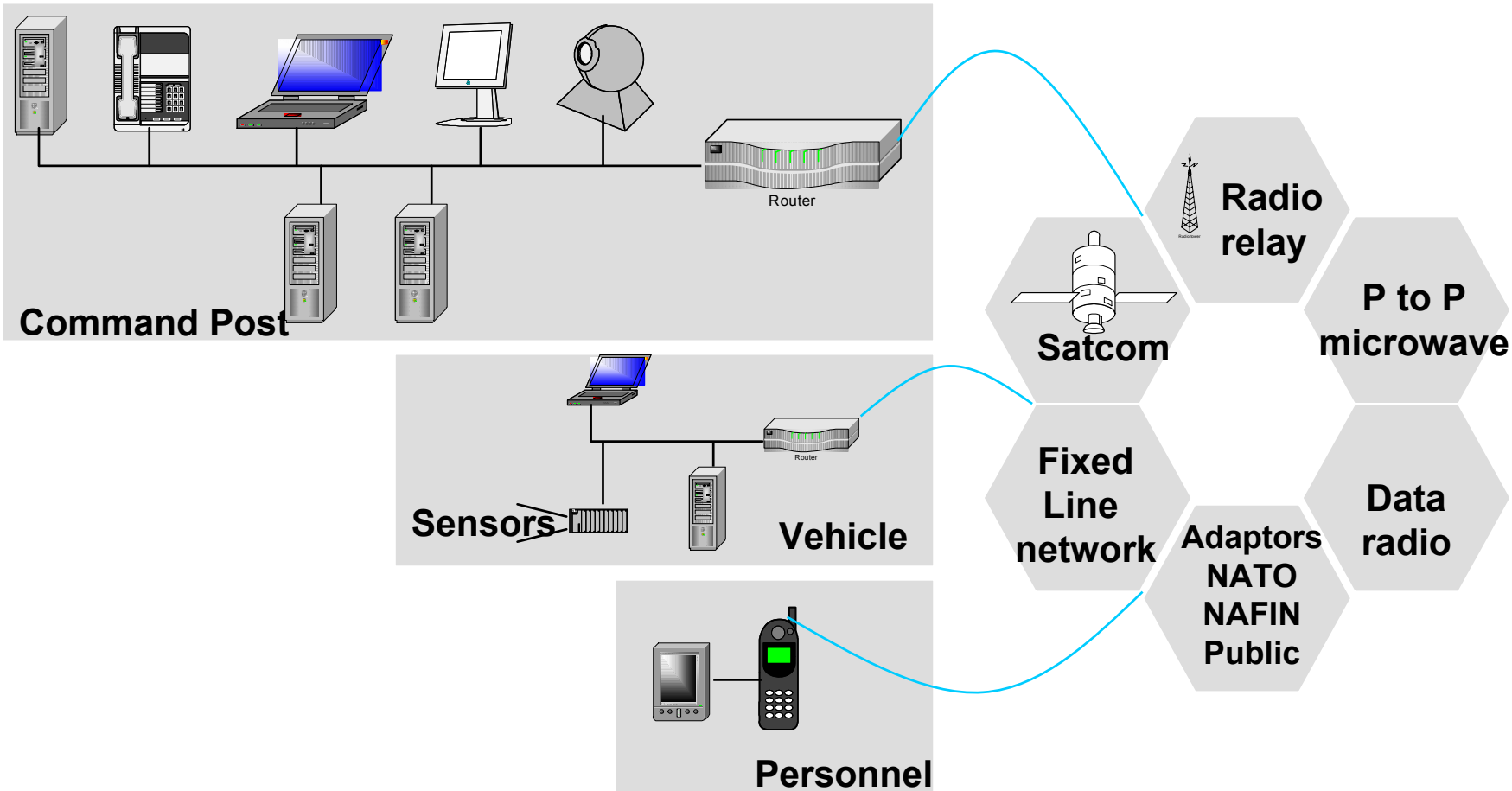
TITAAN design

- Transmission layer:
  - Radio Relay
  - Satcom
  - Dataradio
  - Combat Net Radio
  - FO and FTP Cable
  - Wireless LAN
  - Cellular phones
  - Commercial Providers
  - Link encryption



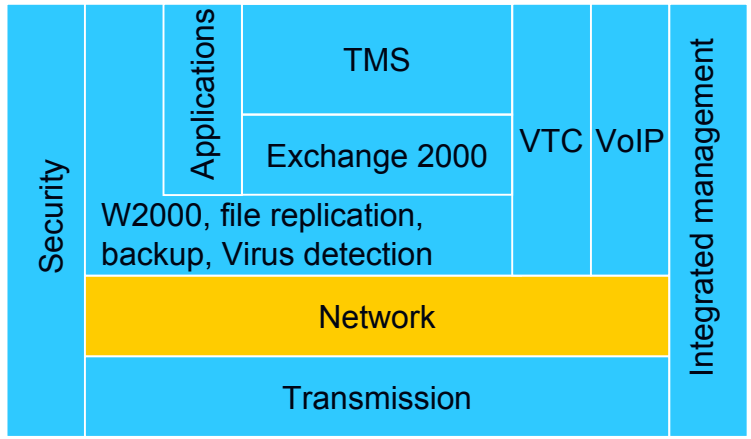
TITAAN design (transmission)

- Communication infrastructure

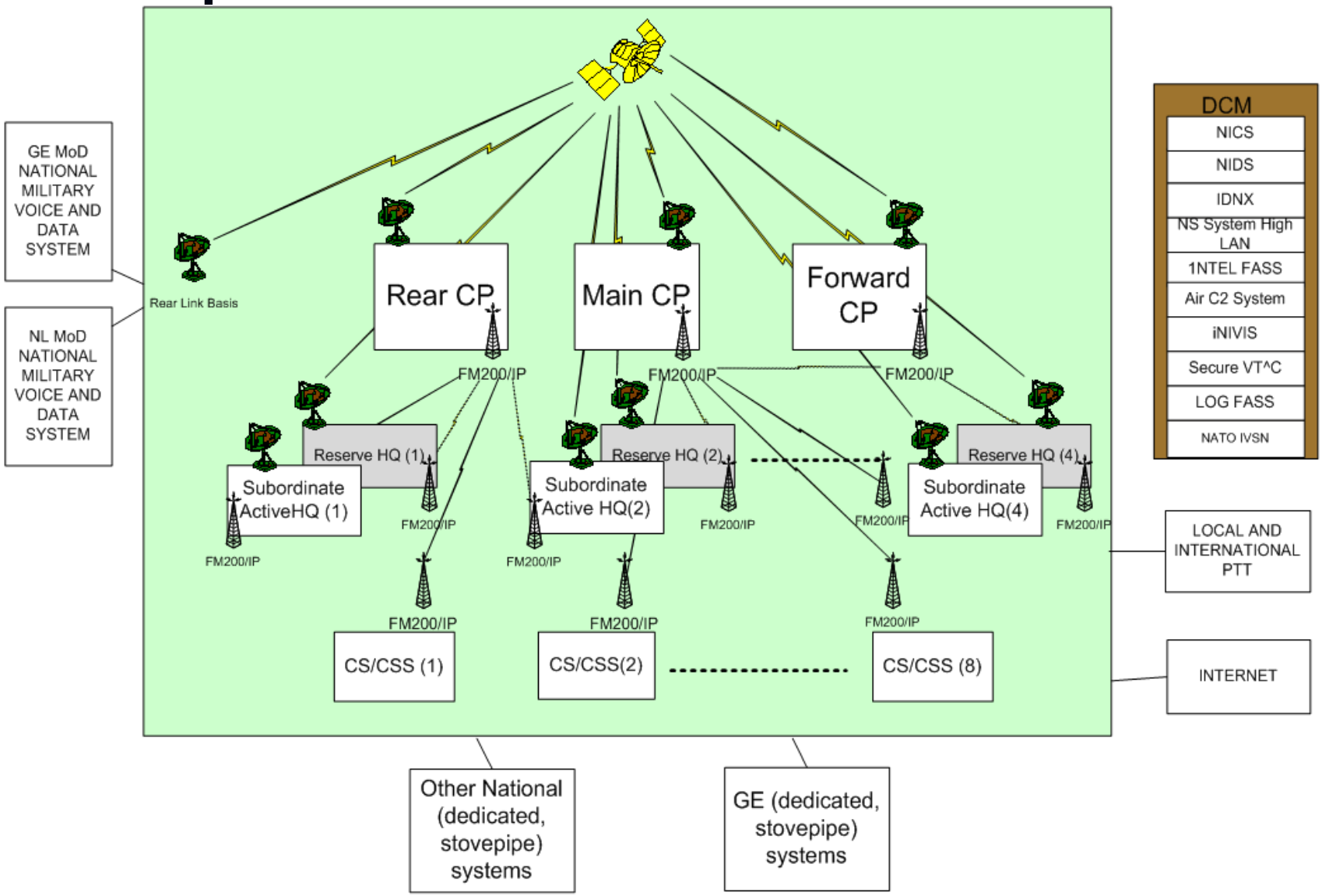


TITAAN design

- Network layer
  - Layer 2 switching
  - Layer 3 IP routing
  - Layer 3 encryption
  - VLAN support
  - Multicasting support
  - Prioritizing and queuing
  - DHCP support
  - Security policies (e.g. ACL)
  - Interfaces
  - Policy Based Networking
  - etc



TITAAN phase 1



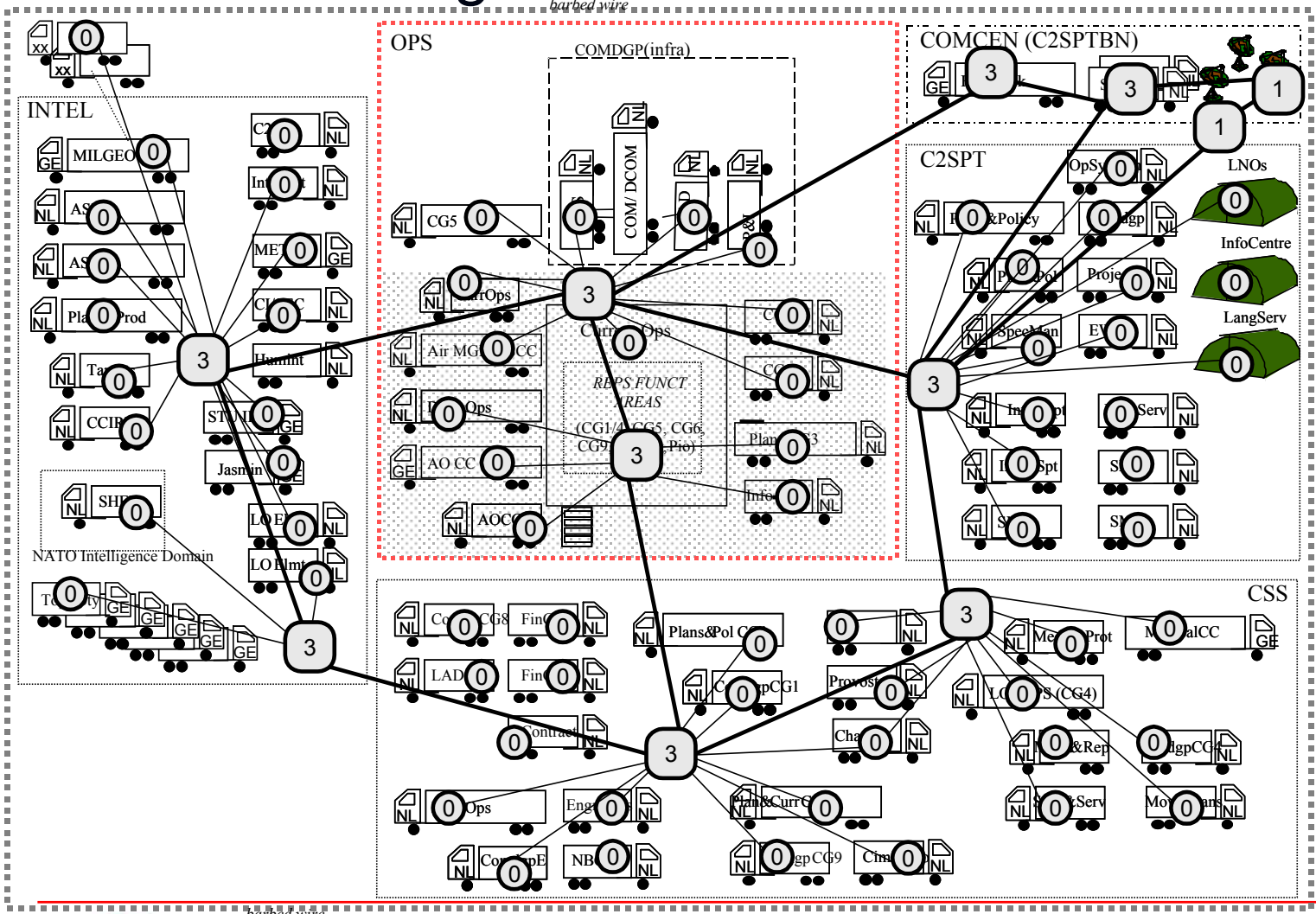
HRF HQ infrastructure requirements

- A CP supports the following end-user equipment:

CP max # of	Computers	Telephones
Main	500	1000
Forward	150	150
Rear	120	120
Sub-ordinate	10	15
CS/CSS	3	3

TITAAN design (network)

- Network building bloks HRF HQ

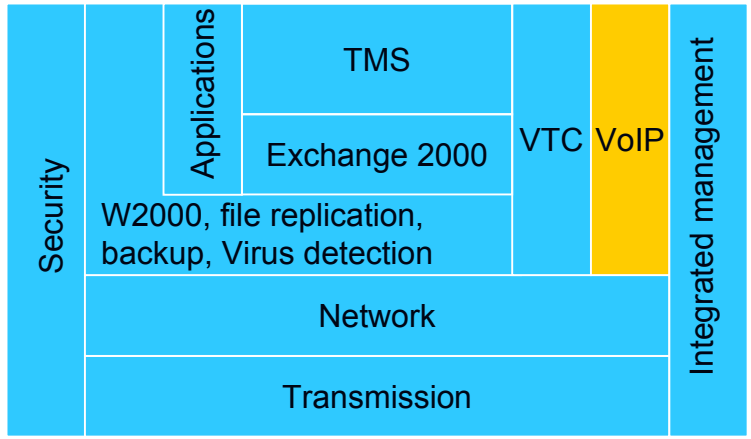


RE/INFORCE

…. the best partner to improve your time critical operations

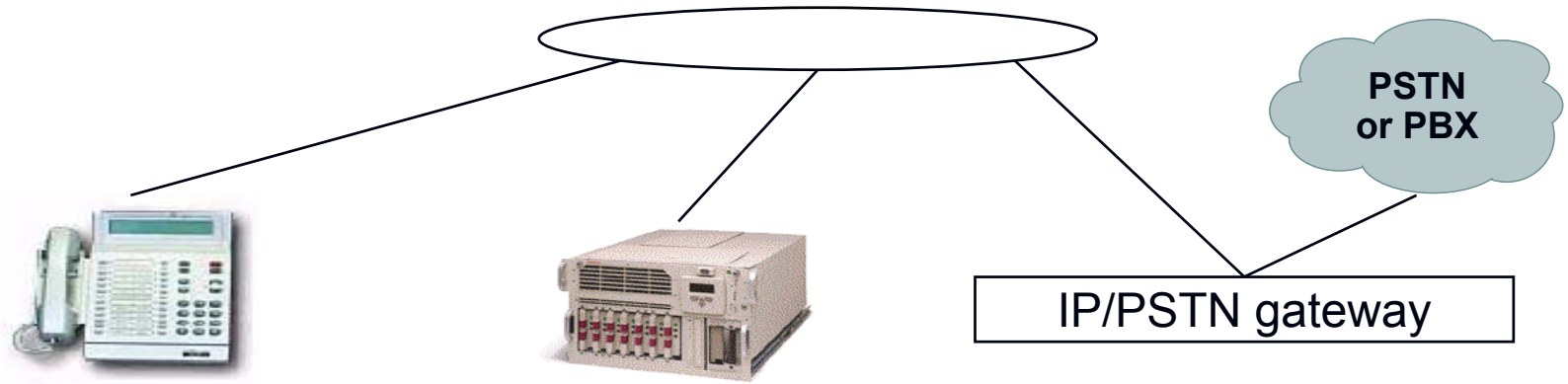
TITAAN design

- Voice Over IP functionalities
  - Should provide all Eurocom phone services
  - Personal mobility
  - Redundancy
  - IP phone services
  - Personal address book
  - Interfaces to other networks
  - Signalling by insecure connections



TITAAN design

- Building blocks IP telephony



User terminal

- Hardware IP phone
- Softphone
- Wireless IP phone

Call processing

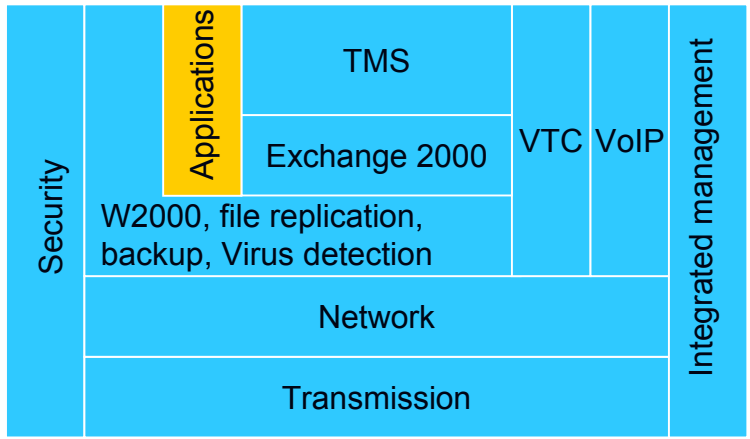
- Call Manager
- Router-based CM
- Gatekeepers
- Service platforms

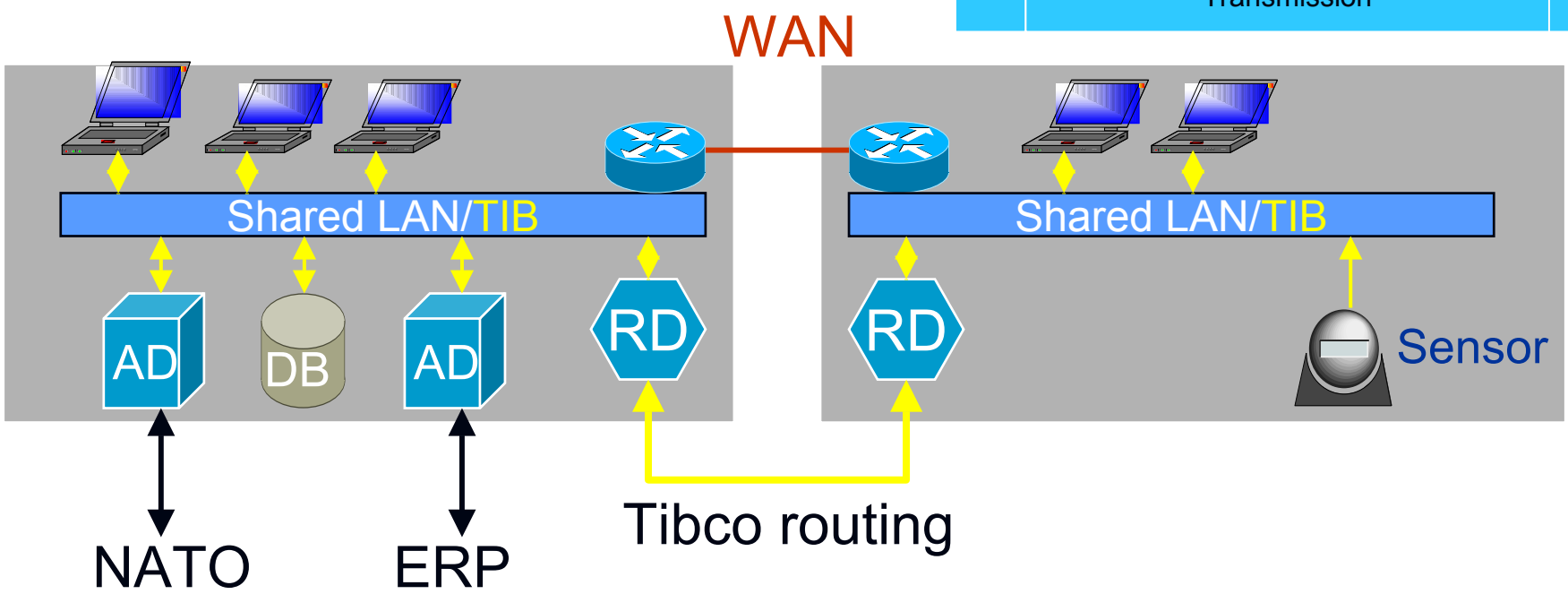
VoIP gateway

- Circuit-switched networks
- Legacy devices (e.g. facs)

TITAAN design

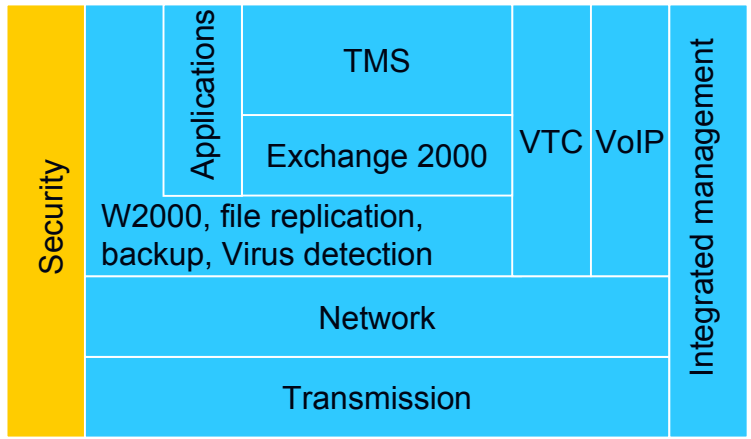
- Information bus concept





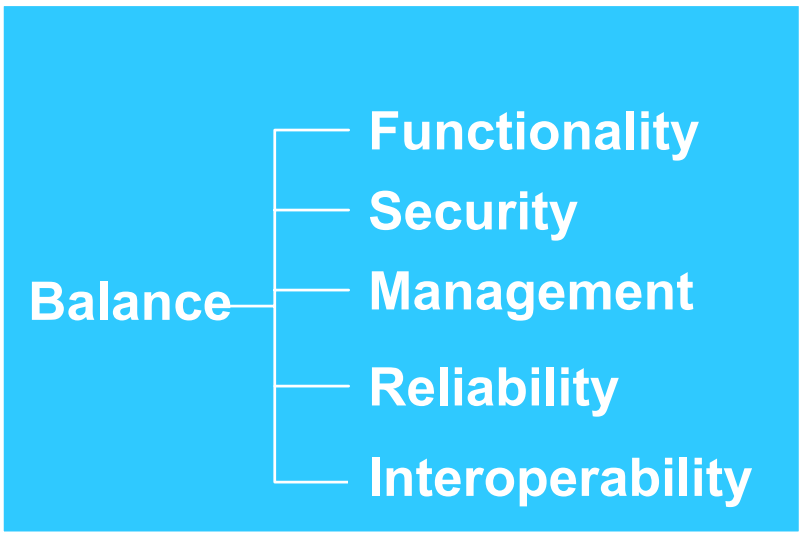
TITAAN design

- Security, the challenge
  - International context
  - NATO/UN/National rules
  - Information vs security
  - Information density
  - Time critical



TITAAN design (security)

- Security concept



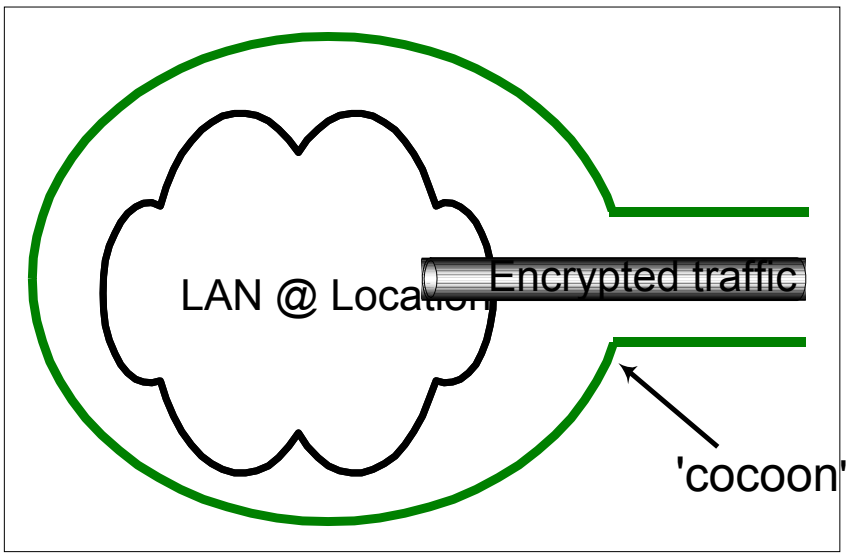
Solution is a combination of:

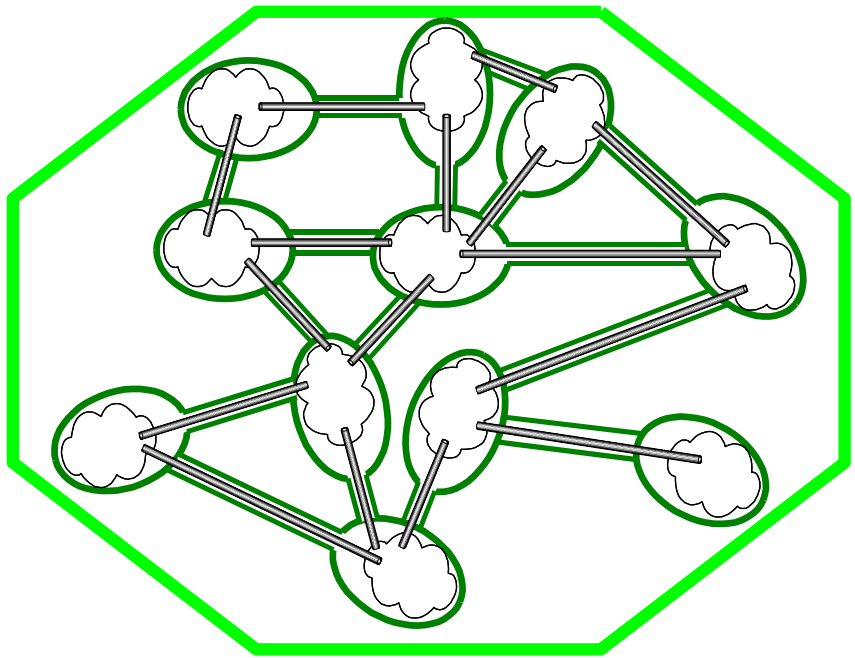
- Encryption on physical layer
- IP layer such as IPsec, VPN, ACL
- PKI
- Firewalls and IDS
- Procedures
- Physical measures such as guards

- Start with level: System High Confidential
- Cocooning
- Off-line encryption and dedicated equipment for Secret information

TITAAN design (security)

- Cocoon paradigm





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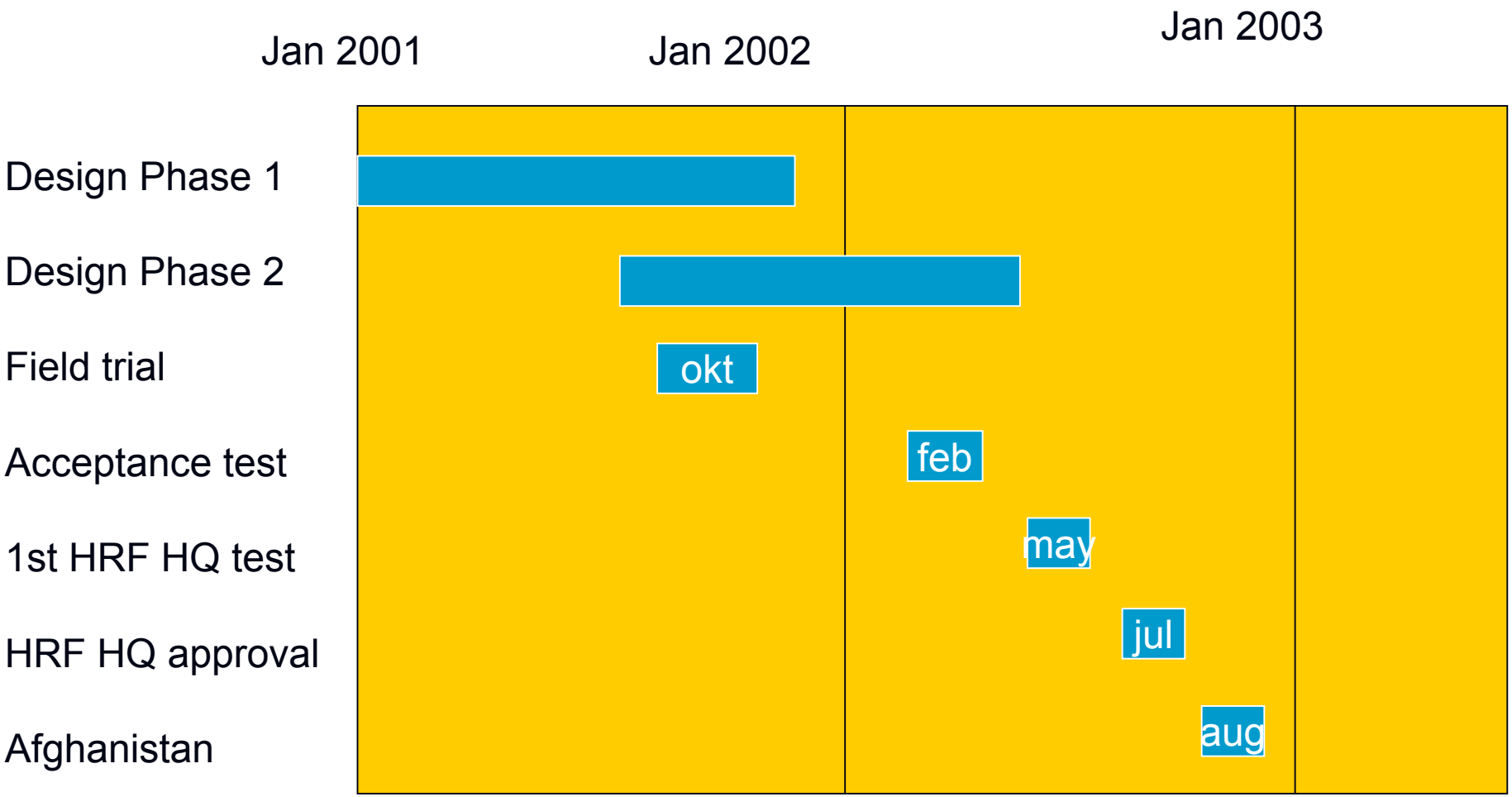
Time line


Jan 2001
Jan 2002
Jan 2003
Design Phase 1
Design Phase 2
Field trial
Acceptance test
1st HRF HQ test
HRF HQ approval
Afghanistan
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feb
may
jul
aug

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TITAAN Summary

- TITAAN for Army and Air force
  - Integrated voice-data-video network
  - IP based routing
  - Military and civil transmission means
  - Integrated basic services
    - VOIP
    - Military mail
    - Directory services
  - Security
  - Local and remote system management

TITAAN

- The focus

Innovation as core business of modern armed forces

....the best partner to improve your time critical operations....

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Lex Bubbers
LTC (ret) RNLA
lex@reinforce.nl